ASTR 1400 Solar System Astronomy (Honors)

Texas Tech University, Spring 2018

Lecture Syllabus Sections H01 CRN 47540

This course will satisfy a four-hour laboratory science requirement. This is an introductory course aimed at a general student audience. Science is more important in our daily lives than ever before – scientific reasoning will play a large role in this course.

Instructor	Contact Info
 **Dr. Robert C. Morehead**	**Email:** robert.morehead@ttu.edu (Preferred Contact Method) **Phone:** (806) 834-7940 **Office:** Science Building RM 014, TTU Lubbock Campus

Office Hours:

To be decided during the first week of class and then posted to Blackboard

By Appointment: http://rmorehead.youcanbook.me.
This site links directly to my calendar and displays all the times I am free, eliminating the need for several emails back and forth to schedule an appointment. However, if you can't find a time to book, don't hesitate to contact me.

Class Meetings

MWF 3:00 - 3:50pm
Science RM 204

General Learning Objectives

Broadly, after completing these course students will be able to:

- Identify and describe the features of our Solar System and the physical principles relevant to astronomy.
- Apply quantitative reasoning to solve a variety astronomical and practical problems.
- Recognize Science as a process and summarize how astronomical data is acquired and understood.
- Develop critical thinking tools that can be applied to life outside the classroom.

A detailed list of individual learning goals by topic will be made available on the course Blackboard site.

Required Materials

- **Main Text**
  21st Century Astronomy: The Solar System, 5th edition
  Authors: Kay, Palen, & Blumenthal
  Publisher: WW Norton
- **Collaborative Lecture Activities**
  Learning Astronomy by Doing Astronomy
  Authors: Palen & Larson

Publisher: WW Norton
Physical Copy Required

- **Online Homework System**
  Smartwork5
  Publisher: WW Norton
- **For the three items above, I highly recommend the looseleaf bundle (ISBN: 9780393653151) available in the TTU Bookstore. Thanks to special pricing arrangements, it will likely be much less than purchasing these items individually**
- **Astronomy 1400: Solar System Astronomy Lab Manual**
  Available in the TTU Campus Bookstore
- **Lecture Response System**
  Turning Point by Turning Technologies 1 Semester License, ISBN: 9780997224863
  Available in the TTU Campus Bookstore or online from the publisher. Note: You should not buy a clicker device, you will use Turning-Point as an app on your smartphone or laptop.
- **Calculators**
  Calculators are not allowed on exams, however, you may use them on homework and during in-class activities if you choose (although you should practice not using them). You will need a calculator in lab sessions.

Course Website

Blackboard: http://ttu.blackboard.com. The course webpage is on the Blackboard (BB) system. Course announcements will be posted on this site. BB will also be used for electronic communications, and to post other relevant course material.

Course Requirements

I expect you to be considerate to me and to your classmates during class.

Please arrive on time, do not pack up your things before class is over, remain until the end of the class period, and notify me before class if you need to leave class early. If you are distracting your classmates or disrupting the class you will be asked to leave.

In return, I will start and end class on time, give you time in class to discuss concepts with your classmates, ask for your feedback about the class, and will be welcoming of all of your questions during class and during my office hours.

Please note that while there is no prerequisite for this class, you will be expected both on the homework and in the exams to be able to perform mathematical calculations without a calculator. Examples will be given in class and in the course notes. Examples of the mathematical concepts we will use in this class are:

- scientific notation
- multiplying and dividing powers of 10
- converting between different metric units
- rearranging and solving simple equations (e.g., if v = H * d, solve for d given v and H)

A colleague of mine co-authored A Student's Guide to the Mathematics of Astronomy (ISBN: 9781107610217), and she wrote it specifically to support courses like ours. You may find it useful with the math used in this course. A copy has been placed in the library course reserves for your use as well.

Assessment

Students' understanding of the learning goals will be evaluated from selected questions on homework assignments, in-class activities, a pre-post concept survey, in-class quizzes, and exams.

Class Preparation

Students are expected to keep up with the material and to not fall behind. It will be assumed that you have completed the assigned readings before the corresponding lecture, so that the lecture can serve as a concentrated review and clarification, with time for discussion. If you are coming to class “cold,” without having read the material in the text, you will find yourself at disadvantage.

Grades

Your final numerical course grade will be calculated as a weighted average of:

- Exam 1 15%*
- Exam 2 15%*
- Cumulative Final Exam 15%*
- Weekly Smartwork5 Homework Assignments (lowest dropped): 10%
- In-Class Quizzes 7%
- In-Class Participation 10%
- Laboratory/Observing: 25%
- Course Surveys: 3% (1% each)

*Your highest exam score, including the final, will be doubled when computing your final course grade.

Final grades will be calculated and rounded to the nearest whole percent and no higher. Although I may adjust the lower end of the grade cutoffs listed below, I guarantee that if your final grade is in the following percentage range you will receive the listed letter grade:

Percentage course grade	Letter grade
>= 90%	A
80%-89%	B
70%-79%	C
55%-69%	D
< 55%	F

Course Communication

Readings and assignments will be posted in a weekly course announcement on Blackboard that will also be sent via email each week. In addition, other important class information will be sent via announcements from time to time. Please check Blackboard and your Texas Tech email at least once a day to ensure you are not missing important course information.

Course Electronics Policy

You will need a smartphone, tablet, or laptop to use the lecture response system for every class. If you do not have access to one of the above devices for use in this course, please contact the instructor as soon as possible.

These devices should only be used for lecture responses, notes, and class-related materials. I recommend turning off notifications and logging out of email and social media to avoid distraction. Keep in mind that tablets and laptops can be especially distracting for other students near you. If your use of technology is bothering other students, you will be asked to put it away or leave the class.

Lecture Response System

You are required to purchase a license for the Turing Point Lecture and log into the session for each class with a session ID code. This ID code will be different for each session and may not be shared with anyone who is not physically present in the classroom. **Any student who shares the code with an absent student or uses a session code when not present will immediately lose all participation credit for the semester (10% of final grade), will be reported to the Office of Student Conduct, and may face more sanctions at the instructors distraction, including a failing course grade.** Don’t share session codes with your absent friends, you won’t be helping them.

In-Class Participation

This course takes a student-centered, active learning approach. You will get much out of the class if you actively participate. Your participation grade will be based on a percentage of in-class clicker questions you answer with the lecture response system. To allow for some flexibility we will set the percentage of clicker responses needed for full credit by class vote on the first day of the course.

Attendance

Faithful attendance is necessary to do well in this course and is required.

You must notify the instructor ahead of time to be excused for absences due to official university events.

If severe illness occurs, seek treatment immediately, contact the instructor as soon as possible, and **stay home**. A plan for any make-up work and/or deadline extensions will be made an individual basis, and documentation from a medical professional will be required. In case of an illness that will require absence from class for more than one week, the student should notify his or her academic dean and advisor.

In-class Team Activities:

Several times throughout the semester we will be completing learning activities we will be completing learning actives from Learning Astronomy by Doing Astronomy. The days we do the activities will be announced in the weekly announcement and you will be expected to bring your workbook to class.

Homework

There will be 13 homework assignments assigned roughly once a week via Smartwork5 during the course. You will generally have at least one week or more to complete them, with a possible exception in the final week of the course. Do not wait until the end of the time period to complete the homework; **problems with a computer or internet access are not acceptable excuses for late assignments in the course.** All Smartwork5 will be due by 11:59 pm on their due date and then they will lose 5% of their value for each day the assignment is late for up to two weeks. After this, no late work will be accepted. Your lowest homework score will be dropped when computing the course grade.

Feedback and Surveys

You will also be asked to complete several short surveys and feedback forms on Blackboard during the semester. These will be announced in class and more details will be posted on Blackboard. All surveys will be due by 11:59 pm on their due date and no late submissions will be accepted.

Laboratory

There is a required laboratory worth 25% of the course grade. You will receive one grade for the lecture and the laboratory combined – they are not separate courses,

NOTE: If you fail the laboratory portion of this class, you will fail the entire course!

However, students who attend labs faithfully rarely fail.

In addition to the weekly lab meetings, you have the opportunity to visit the Texas Tech Observatory for some nighttime observations as part of your lab grade. **These observational exercises are not optional**. All necessary information regarding these activities will be posted on the observatory website (linked from the Texas Tech Department of Physics homepage); it will also be discussed by your laboratory instructor during the first week of class. If no lab is listed on your schedule, see your professor immediately. **Questions about the laboratory should be addressed to your laboratory instructor or the astronomy lab coordinator Gwen Armstrong (gwen.armstrong@ttu.edu)**

Quizzes

There will be four 15 minute in-class quizzes given over the course of the semester and will be composed of 10-15 multiple choice questions similar to questions you will have on the exams. Quizzes will be delivered electronically using the lecture response system.

Exam Policy

There will be two exams. The exam will cover material up to the date of that exam, it will be administered in the lecture room, and a 5-choice (orange) scantron, a #2 pencil (with eraser), and your Texas Tech ID. There is no make-up day for the exam unless severe illness occurs (see class policies regarding illness). In the event of a documented direct conflict (two exams scheduled at the **same time** on the same day), students should contact the instructor at least 10 days before the exam.

Zero tolerance on cell phones and other internet capable devices:

All internet connected devices that can display any text (cell phones, tablets, smartwatches, fitness trackers, etc.) must be put away during the exam. If you are caught using a device or even having visible and assessable for any reason, you will be automatically considered cheating, you will not be allowed to finish the exam and you will receive a grade of zero. The incident will then be referred to the Office of Student Conduct and may result in further sanctions.

If you a have a valid need to be contactable during the exam, for example, work, family needs, etc., please speak to the instructor before the exam and accommodations can be made.

Final Exam Policy

There will be one final exam worth 15% of the final numerical course grade. There is no make-up day for the final exam: the Final Exam is mandatory. The final exam is comprehensive, it will be administered in the lecture room, and a 5-choice (orange) scantron, a #2 pencil (with eraser), and your Texas Tech ID. **The Final examination will be Saturday, May 12th, 4:30 p.m. to 7:00 p.m.**

TTU's policy regarding final exams states:

1. ALL Final Exams must be given at the assigned time. They may not be given prior to the officially assigned time.
2. If a student misses their Final Exam, they must contact their Instructor. This is a matter between the student and the Instructor. The policy for this class is that no make-up Final Exams will be given except in the event of **severe** documented illness/emergency.
3. There is no policy on how many Final Exams a student can have in one day. The Final Exam Schedule was posted in the Schedule of Classes and must be followed. For more info about the final exam policy, please visit: http://www.depts.ttu.edu/opmanual/OP34.10.pdf

Planned Course Topics

This is a list the broad course topics that I plan to cover, but it may be revised as the semester progresses.

- The Motion of the Sky
- The Earth-Sun-Moon System
- The Copernican Revolution
- The Process of Science
- Forces, Gravity, and Orbits
- The Architecture and Scale of the Solar System
- The Sun
- Planet Formation
- Comets, Asteroids, & Meteors
- Detecting Exoplanets
- Terrestrial Planets
- Terrestrial Planet Atmospheres

- Gas Giant Planets
- Moons of the Outer Solar System
- Planetary Ring Systems
- Astrobiology

Course Dates

This projected schedule is tentative and is subject to change with advance notice.

Week	Dates	Assignments Due	Quizzes and Exams
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Week 1	01/18 - 01/19		
Week 2	01/22 - 01/26	01/26 Introductory Astronomy Survey	
Week 3	01/29 - 02/02	02/02 Homework 1	
Week 4	02/05 - 02/09	02/09 Homework 2	02/09 Quiz 1
Week 5	02/12 - 02/16	02/16 Homework 3	
Week 6	02/19 - 02/23	02/23 Homework 4	02/23 Quiz 2
Week 7	02/26 - 03/02	03/02 Homework 5	
Week 8	03/05 - 03/09	03/09 Homework 6 & Mid-Semester Feedback Survey	03/07 Exam 1
-	03/12 - 03/16	Spring Break!	
Week 9	03/19 - 03/23		
Week 10	03/26 - 03/30	03/30 Homework 7	
Week 11	04/03 - 04/06	04/06 Homework 8	04/06 Quiz 3
Week 12	04/09 - 04/13	04/13 Homework 9	
Week 13	04/16 - 04/20	04/20 Homework 10	04/20 Quiz 4
Week 14	04/23 - 04/27	04/27 Homework 11	
Week 15	04/30 - 05/04	05/04 Homework 12	04/30 Exam 2
Week 16	05/07 - 05/08	05/08 Homework 13 & Astronomy Exit Survey	
Final Exam	Saturday, May 12th, 4:30 p.m. to 7:00 p.m.		

POSSIBLE CLASS VIDEOTAPING

I am committed to improving my teaching so this year I am participating in TTU's STEM Teaching, Engagement & Pedagogy (STEP) Program as a STEP Fellow. This means that several times this semester we may have other faculty visiting to observe the course and I may be videotaped as I teach. The camera will be placed in the back of the room, but it is possible your voice or likeness may be recorded. The recording will not be distributed in any way (only I will have a copy for my own use during the program), but I will give you plenty of notice of any videotaping so that you may choose to sit out of the camera's view if you would like.

ACADEMIC INTEGRITY

I support the TTU Code of Student Conduct. Essentially, it states:

> *It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.*

For the remainder of the code, see: http://www.depts.ttu.edu/opmanual/OP34.12.pdf

RELIGIOUS HOLIDAYS

Texas law requires institutions of higher education to excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holiday. The student shall also be excused for time necessary to travel. An institution may not penalize the student for the absence and allows for the student to take an exam or complete an assignment from which the student is excused. While no prior notification of the instructor is required, OP 34.19 indicates that a student who intends to observe a religious holiday should make that intention known to the instructor prior to the absence. The student should make up any missed work. For more information, please visit: https://www.depts.ttu.edu/opmanual/OP34.19.pdf

DISABILITY SERVICES

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructor's office hours. Please note: instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, please contact Student Disability Services in 335 West Hall or call **806.742.2405**. http://www.depts.ttu.edu/opmanual/OP34.22.pdf

UNIVERSITY COUNSELING AND RESOURCES FOR DISCRIMINATION, HARASSMENT, AND SEXUAL VIOLENCE

The university experience can be a time of substantial growth for students, filled with changes, challenges and new decisions. Few students move through this time without some personal turbulence, and many experience periods of trauma, crisis, stress, and confusion. The Student Counseling Center staff is available to help students with any problems they may be experiencing. For more information, please visit: http://www.depts.ttu.edu/scc/. Texas Tech University is committed to providing and strengthening an educational, working, and living environment where students, faculty, staff, and visitors are free from gender and/or sex discrimination of any kind. Sexual assault, discrimination, harassment, and other Title IX violations are not tolerated by the University. Report any incidents to the Office for Student Rights & Resolution, **(806)-742-SAFE (7233)** or file a report online at titleix.ttu.edu/students. Faculty and staff members at TTU are committed to connecting you to resources on campus. Some of these available resources are:

- **TTU Student Counseling Center**, **806-742-3674**, https://www.depts.ttu.edu/scc/ (Provides confidential support on campus.)
- **TTU Student Counseling Center 24-hour Helpline**, **806-742-5555**, (Assists students who are experiencing a mental health or interpersonal violence crisis. If you call the helpline, you will speak with a mental health counselor.)
- **Voice of Hope Lubbock Rape Crisis Center**, **806-763-7273**, http://voiceofhopelubbock.org (24-hour hotline that provides support for survivors of sexual violence.)
- **The Risk, Intervention, Safety and Education (RISE) Office**, **806-742-2110**, http://rise.ttu.edu (Provides a range of resources and support options focused on prevention education and student wellness.)
- **Texas Tech Police Department**, **806-742-3931**, http://www.depts.ttu.edu/ttpd/ (To report criminal activity that occurs on or near Texas Tech campus.)

SECURITY

It is very important that you familiarize yourself with the emergency procedures for evacuation, fire, flood, medical, violence and workplace threats, and tornado. You can find these procedures at the following link: http://www.depts.ttu.edu/communications/emergency/procedures.php In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location. When clear of the building please continue away from the building and meet class Instructor at Memorial Circle.

EMERGENCY NOTIFICATIONS AND ALERTS

TechAlert! is the principal method that the University uses to communicate emergency situations and class cancellations or delays. If you have not already done so this semester, update cell phone, home phone or text message information at: https://appserv.itts.ttu.edu/EmergencyAlert/